

No. of Printed Pages : 4

MCS-208

**POST GRADUATE DIPLOMA IN
COMPUTER APPLICATION
(PGDCA)**

Term-End Examination

June, 2025

MCS-208 : DATA STRUCTURES AND ALGORITHMS

Time : 3 Hours

Maximum Marks : 100

Note : (i) *Question No. 1 is compulsory.*

(ii) *Attempt any **three** questions from the rest.*

(iii) *All algorithms should be written nearer to 'C' language.*

-
-
1. (a) What are arrays ? Write an algorithm for addition of *two* matrices. 10

B-1090/MCS-208

P. T. O.

- (b) Describe the implementation of a queue using a linked list. 10
- (c) Write non-recursive algorithm for postorder traversal of a binary tree. Explain with the help of an example. 10
- (d) Explain what is collision in the context of 'hashing'. What methods can be employed to address collisions ? 10
2. (a) What is Depth First Search (DFS) ? How does it differ from Breadth First Search (BFS) ? Give examples for DFS and BFS. 10
- (b) What is a time complexity ? How does it differ from space complexity ? Give an example for each to calculate time complexity and space complexity. 10

3. (a) Explain stack implementation using an array. What are the advantages and limitations of this approach ? Illustrate it with the help of an example. 10
- (b) What are singly linked lists ? Write an algorithm to count the number of items stored in a single linked list. 10
4. (a) Explain Kruskal's algorithm for finding minimum cost spanning tree in a graph with the help of an example. 10
- (b) What are the characteristics of an AVL tree ? How do rotations help in balancing an AVL tree when it becomes unbalanced ? 10
5. (a) Convert the following expressions to postfix : 10
- (i) $(a * b \wedge c) / (d - e)$

(ii) $(a + b)(c + d \wedge e)$

- (b) Write an algorithm for quick sort. Sort the following set of data in ascending order using quick sort. Show all steps of application of the algorithm : 10

10, 5, 6, 7, 15, 8

Write the best case and worst case time complexities.

× × × × ×

